MARINE ECOLOGY
PROGRESS SERIES

Volume 63 (1990)

Editor
Otto Kinne

Assistant Editor: John Austin
Assistant to the Editors: Susan Matthews

Ecology Institute, Nordbünte 23, D-2124 Oldendorf/Luhe, Federal Republic of Germany;
Tel (04132) 727, Fax (04132) 8883

Inter-Research
1990

Editorial Advisors

Editorial Advisors to Marine Ecology Progress Series are appointed for a four-year period. They are expected to:

- ○ critically evaluate the scientific merits of manuscripts submitted for publication
- ○ suggest topics and authors for reviews
- ○ select and present suitable high-quality manuscripts
- ○ draw attention to new facts, concepts and methods

In addition to the Editorial Advisors listed below, about 300 referees cooperate anonymously.

ENVIRONMENTAL FACTORS

Alderdice, D., Dr
Pacific Biological Station, Nanaimo, B.C., Canada V9R 5K6
Responses to environmental factors

Collos, Y., Dr
Dept of Oceanography, The University of British Columbia, 6270 University Boulevard, Vancouver, B.C., Canada V6T 1W5
Nitrogen metabolism of phytoplankton

Dring, M. J., Dr
Botany Dept, The Queen's Univ. of Belfast, Belfast BT7 1NN, Northern Ireland
Physiological ecology of algae

Fisher, N. S., Dr
Marine Sciences Research Center, State Univ. of New York, Stony Brook, NY 11794-5000, USA
Physiological ecology of phytoplankton

Fowler, S. W., Dr
IAEA, ILMR, Stade Louis II, Entrée C-19, Ave des Castellans, MC-98000 Monaco
Environmental effects on invertebrates

Gunkel, W., Dr
Biologische Anstalt Helgoland, D-2192 Helgoland, Federal Republic of Germany
Marine bacteriology

Haedrich, R. L., Prof.
Memorial University of Newfoundland, St. John's, Nfld., Canada A1B 3X9
Environmental effects on fishes (incl. deep sea)

Kasyanov, V., Dr
Institute of Marine Biology, Academy of Sciences, Vladivostok 690032, USSR
Environmental effects on invertebrates; reproduction, development

Kiørboe, T., Dr
Danish Institute for Fisheries and Marine Res., Charlottenlund Castle, DK-2920 Charlottenlund, Denmark
Physiological ecology of zooplankton, including fishes (esp. larvae)

Lawrence, J. M., Prof.
Dept of Biology, Univ. of South Florida, Tampa, FL 33620, USA
Physiological ecology of invertebrates

MacLeod, R. A., Prof.
Dept of Microbiology, Faculty of Agriculture, MacDonald College, 21, 111 Lakehore Road, Ste. Anne de Bellevue, P.Q., Canada H9X 1C0
Physiological ecology of microorganisms

McLusky, D. S., Dr
Dept of Biological Sciences, Univ. Stirling, Stirling FK9 4LA, Scotland
Physiological ecology of invertebrates

Meyer-Reil, L.-A., Dr
Institut für Meereskunde, Düsternbrooker Weg 20, D-2300 Kiel, Federal Republic of Germany
Environmental effects on benthic microorganisms, benthic microbial ecology

Meyers, S. P., Prof.
Dept of Food Science, Louisiana State Univ., Baton Rouge, LA 70803, USA
Physiological ecology of microorganisms

Morita, R. Y., Prof.
Dept of Microbiology, Oregon State Univ., Corvallis, OR 97331, USA
Marine microbiology

Paasche, E., Prof.
Dept of Biology, Univ. Oslo, Marine Botany, PO Box 1069, Blindern, N-0316 Oslo 3, Norway
Physiological ecology of phytoplankton; primary production; benthic algae

Rheinheimer, G., Prof.
Institut für Meereskunde, Univ. Kiel, Düsternbrooker Weg 20, D-2300 Kiel, Federal Republic of Germany
Marine microbiology

Riisgård, H. U., Dr
Odense Universitet, Biologisk Institut, Campusvej 55, DK-5230 Odense M., Denmark
Environmental effects on invertebrates; bioenergetics of suspension feeders

Sammarco, P. W., Dr
Resource Assessment Commission, Locked Bag No. 1, Queen Victoria Terrace, Canberra, ACT 2600, Australia
Experimental ecology; chemical ecology

Scheltema, R. S., Dr
Woods Hole Oceanographic Institution, Woods Hole, MA 02543, USA
Reproduction of benthic invertebrates

Sidell, B. D., Prof.
Dept of Zoology, Univ. of Maine at Orono, Murray Hall, Orono, ME 04469, USA
Physiological ecology and biochemistry of fishes

Southward, A. J., Dr
Plymouth Marine Laboratory, Citadel Hill, Plymouth PL1 2PB, England
Environmental effects on invertebrates

Vernberg, J., Prof.
Belle W. Baruch Institute for Marine Biol. and Coastal Res., Univ. of South Carolina, Columbia, SC 29208, USA
Physiological ecology of invertebrates

Winter, J. E., Dr
Instituto de Zoología, Univ. Austral de Chile, Casilla 567, Valdivia, Chile
Physiological ecology of invertebrates

PHYSIOLOGICAL MECHANISMS

Alderdice, D., Dr
Pacific Biological Station, Nanaimo, B. C., Canada V9R 5KR
Resistance to stress including pollution; regulation; adaptation

Batty, R. S., Dr
Dunstaffnage Marine Research Laboratory, PO Box 3, Oban, Argyll PA34 3AD, Scotland
Behavioral physiology of fish; feeding; predation of fish larvae

Bayne, B. L., Dr
Plymouth Marine Laboratory, Prospect Place, West Hoe, Plymouth PL1 3DH, England
Comparative physiology

Bulnheim, H.-P., Prof.
Biologische Anstalt Helgoland, Notkestr. 31, D-2000 Hamburg 52, Federal Republic of Germany
Metabolic performance of invertebrates; reproductive biology and sexuality

Costlow, J. D., Jr, Prof.
Duke University Marine Laboratory, Pivers Island, Beaufort, NC 28516, USA
Developmental physiology; endocrinology

Enright, J. T., Prof.
Scripps Institution of Oceanography, San Diego, PO Box 1529, La Jolla, CA 92093, USA
Biological rhythms

Forward, R. B., Jr, Dr
Duke University Marine Laboratory Pivers Island, Beaufort, NC 28516–9721, USA
Environmental zoo-physiology; behavior; biological rhythms

Gerking, S. D., Prof.
Dept of Zoology, Arizona State Univ.,Tempe, AZ 85281, USA
Fish physiology

Holland, N. D., Prof.
Scripps Institution of Oceanography, San Diego, PO Box 1529, La Jolla, CA 92093, USA
Comparative, cellular and developmental physiology

Humphrey, G. F., Dr
CSIRO Marine Biochemistry, Building A12, Sydney Univ., N.S.W. 2006, Australia
Photosynthesis; plankton biochemistry

Levandowsky, M., Dr
Haskins Laboratories at Pace Univ., 41 Park Row, New York, NY 10038, USA
Chemosensory behavior; mathematical models

Naylor, E., Prof.
School of Animal Biology, Univ. Coll. of North Wales, Bangor, Gwynedd LL57 2UW, Wales, UK
Behavioural physiology; invertebrate biology

Marinescu, A.-G., Dr
Institute of Biological Sciences, 77748 Bucharest, Str. Splaiul-Independentei 296, Romania
Stress effects on invertebrates

McLusky, D. S., Dr
Dept of Biological Sciences, Univ. Stirling, Stirling FK9 4LA, Scotland
Osmoregulation in estuarine invertebrates

Puiseux-Dao, S., Prof.
Laboratoire de Cytophysiologia végétale et de Toxicologie cellulaire, Université de Paris VII, 2, Place Jussieu, F-75251 Paris Cedex 05, France
Ecophysiology and toxicology of algae; cellular biology; behavior of algae

Zhirmunsky, A. V., Prof.
Institute of Marine Biology, Academy of Sciences, Vladivostok 690032, USSR
Mechanisms of cellular resistance and control

CULTIVATION

Lawrence, J. M., Prof.
Dept of Biology, Univ. of South Florida, Tampa, FL 33620, USA
Nutrition of invertebrates

Levandowsky, M., Dr
Haskins Laboratories at Pace Univ., 41 Park Row, New York, NY 10038, USA
Microcosm cultures

Meyers, S. P., Prof.
Dept of Food Science, Louisiana State Univ., Baton Rouge, LA 70803, USA
Cultivation of microorganisms and crustaceans; aquaculture; microenvironments

Paffenhöfer, G.-A., Prof.
Skidaway Institute of Oceanography, Univ. System of Georgia, PO Box 13687, Savannah, GA 31416, USA
Cultivation of zooplankton

Pandian, T. J., Prof.
School of Biological Sciences, Madurai Kamaraj Univ., Madurai 625 021, Tamilnadu, India
Cultivation of decapods and fishes; bioenergetics

Rheinheimer, G., Prof.
Institut für Meereskunde, Univ. Kiel, Düsternbrooker Weg 20, D-2300 Kiel, Federal Republic of Germany
Cultivation of microorganisms

Winter, J. E., Dr
Instituto de Zoología, Univ. Austral de Chile, Casilla 567, Valdivia, Chile
Cultivation of invertebrates

DYNAMICS

Arndt, E. A., Prof.
Wilhelm-Pieck-Universität Rostock, Sektion Biologie, Freiligrathstr. 7/8, DDR-2500 Rostock, German Democratic Republic
Ecological dynamics of brackish waters

Bak, R. P. M., Dr
Nederlands Instituut voor Onderzoek der Zee, Postbox 59, 1790 AB Den Burg – Texel, The Netherlands
Coral-reef ecology

Banse, K., Prof.
School of Oceanography, WB-10, Univ. of Washington, Seattle, WA 98195, USA
Biological oceanography; plankton research

Berman, T., Prof.
Kinneret Limnological Laboratory, PO Box 345, Tiberias 14102, Israel
Phytoplankton ecology

Bianchi, A., Dr
C.N.R.S. ER 223, Microbiologie Marine, Campus de Luminy – case 907, 70, route Léon Lachamp, F-13288 Marseille Cedex 9, France
Marine microbiology; ecological dynamics

Birkeland, C., Prof.
Univ. of Guam, Marine Laboratory, UOG Station, Mangilao, Guam 96913
Coral-reef ecology; benthic ecology

Brown, B. E., Dr
Dept of Biology, The University, Newcastle upon Tyne NE1 7RU, England
Physiology and ecology of corals

Bunt, J. S., Dr
240 Toogood Road, Bayview Heights, Cairns, Q. 4868, Australia
Mangrove systems; reef studies

Collos, Y., Dr
Dept of Oceanography, The University of British Columbia, 6270 University Boulevard, Vancouver, B.C., Canada V6T 1W5
Nitrogen cycling and primary production

Conover, R. J., Dr
Marine Ecology Laboratory, Bedford Institute of Oceanography, PO Box 1006, Dartmouth, N.S., Canada B2Y 4A2
Zooplankton biology, physiology, biochemistry

Cushing, D. H., Dr
Ministry of Agriculture, Fisheries and Food, Fisheries Laboratory, Lowestoft, Suffolk NR33 OHT, England
Productivity of the sea; fish-population dynamics; biological oceanography

Fenchel, T., Prof.
Marine Biological Laboratory (University of Copenhagen), DK-3000 Helsingør, Denmark
Population biology; microbial ecology

Field, J. G., Prof.
University of Cape Town, Zool. Dept, Rondebosch 7700, Republic of South Africa
Dynamics of nearshore ecosystems

Foster, M. S., Prof.
Moss Landing Marine Laboratories, California State Univ., PO Box 450, Moss Landing, CA 95039-040, USA
Population and community ecology of macroalgae

Fuhrman, J., Prof.
Marine Biology Res. Section, Dept of Biological Sciences, Univ. of Southern California, Los Angeles, CA 90089-0371, USA
Planktonic microbial ecology. Productivity and growth of microorganisms, especially bacteria

Furness, R. W., Dr
Department of Zoology, The University of Glasgow, Glasgow G12 8QQ, Scotland
Ecology of sea birds

Gage, J. D., Dr
Dunstaffnage Marine Research Laboratory, PO Box 3, Oban, Argyll PA34 4AD, Scotland
Benthos of deep sea and temperate coasts

Gerlach, S. A., Prof.
Institut für Meereskunde, Düsternbrooker Weg 20, D-2300 Kiel, Federal Republic of Germany
Benthos ecology

Golikov, A. N., Dr
Zoological Institute, Academy of Sciences, Leningrad V-164, USSR
Biocoenoses; speciation; evolution

Gray, J., Prof.
Institutt for Marinbiologi og Limnologi, Univ. Oslo, Postboks 1064, Blindern, Oslo 3, Norway
Soft-sediment ecology

Haedrich, R. L., Prof.
Memorial University of Newfoundland, St. John's, Nfld., Canada A1B 3X9
Zoogeography; natural history of fish

Harding, G. C., Dr
Marine Ecology Laboratory, Bedford Institute of Oceanography, PO Box 1006, Dartmouth, N.S., Canada B2Y 4A2
Crustacean ecology (incl. deep sea)

Hay, M., Prof.
Institute of Marine Sciences, The University of North Carolina at Chapel Hill, 3407 Arendell Street, Morehead City, NC 28557, USA
Benthic community ecology; coral reef ecology; plant-herbivore interactions, seaweed ecology; chemical ecology

Heck, K. L., Jr, Dr
Marine Environmental Sciences Consortium, Dauphin Island Sea Lab., PO Box 369-370, Dauphin Island, AL 36528, USA
Benthic ecology, emphasis on seagrass ecosystems

Hessler, R. R., Dr
Scripps Institution of Oceanography, San Diego, PO Box 1529, La Jolla, CA 92093, USA
Deep-sea ecology; benthic ecology; palaeontology

Holm-Hansen, O., Dr
Scripps Inst. of Oceanography, Univ. of California, La Jolla, CA 92093, USA
Polar ecology; chemical oceanography; photosynthesis

Hudon, C., Dr
Arctic Biological Station, Dept of Fisheries & Oceans, 555 St-Pierre Blvd, Ste-Anne de Bellevue, Quebec, Canada H9X 3R4
Crustacean ecology and biology

Hughes, R. N., Dr
School of Animal Biology, Univ. College North Wales, Bangor, Gwynedd LL57 2UW, Wales, UK
Ecological energetics (particularly feeding)

Kiørboe, T., Dr
Danish Institute for Fisheries and Marine Res., Charlottenlund Castle, DK-2910 Charlottenlund, Denmark
Biological oceanography; physical and biological processes in the pelagical with emphasis on copepods and fish larvae

Klumpp, D., Dr
Australian Institute of Marine Science, PMB No. 3, Townsville M. C., Q. 4810, Australia
Trophodynamics; animal nutrition, energy and nutrient budgets; nutrient cycling; primary productivity; fish biology; seagrass, coral reef, kelp bed ecosystems

Kühlmann, D., Dr
Museum für Naturkunde der Humboldt-Univ., Invalidenstr. 43, DDR-104 Berlin, German Democratic Republic
Coral-reef ecology; coral evolution

Landry, M. R., Dr
Dept of Oceanography, Univ. of Hawaii, Manoa, 1000 Pope Rd, Honolulu, HI 96822, USA
Food web interactions; zooplankton ecology

Lawrence, J. M., Prof.
Dept of Biology, Univ. of South Florida, Tampa, FL 33620, USA
Reproduction of invertebrates; nutrition

Levandowsky, M., Dr
Haskins Laboratories at Pace Univ., 41 Park Row, New York, NY 10038, USA
Ecological modelling; phytoplankton ecology

Levings, C., Dr
West Vancouver Laboratory, 4160 Marine Drive, West Vancouver, B.C., Canada V7V 1N6
Estuarine ecology of macrobenthos and fish

Lewis, J. B., Dr
Dept of Biology, McGill Univ., Stewart Biology Bldg, 1205 Dr. Penfield, Montreal, Quebec, Canada H3A 1B1
Coral-reef ecology; tropical marine biology

Lewis, M. R., Dr
NASA, National Aeronautics and Space Administration, Washington, D.C. 20546, USA
Biological oceanography; phytoplankton physiology; modelling of physical and biological processes

Mauchline, J., Dr
Scottish Marine Biological Ass., Dunstaffnage Marine Res. Lab., POB 3, Oban, Argyll PA34 4AD, Scotland
Deep-sea ecology; radioactive pollution

Neushul, M., Prof.
Dept of Biological Sciences, Univ. of California, Santa Barbara, CA 93106, USA
Ecology of benthos algae; marine macrophytes

Newell, S. Y., Dr
The University of Georgia, Marine Institute, Sapelo Island, GA 31327, USA
Ecology of fungi and bacteria; decomposition

Nybakken, J., Prof.
Moss Landing Marine Laboratories, California State Univ., PO Box 450, Moss Landing, CA 95039-0450, USA
Ecology of molluscs; community structure of soft-sediment invertebrates

Omori, M., Dr
Tokyo University of Fisheries, Research Lab. of Fisheries Resources, 4-5-7, Konan, Minato-ku, Tokyo, 108, Japan
Biological oceanography; zooplankton

Paffenhöfer, G.-A., Prof.
Skidaway Institute of Oceanography, Univ. System of Georgia, PO Box 13687, Savannah, GA 31416, USA
Zooplankton ecology

Parsons, T. R., Prof.
Dept of Oceanography, Univ. of British Columbia, 6270 University Boulevard, Vancouver, B.C., Canada V6T 1W5
Biological oceanography; mathematical modelling

Pearse, J. S., Prof.
Center for Coastal Marine Studies, Univ. of California, Santa Cruz, CA 95064, USA
Kelp forest ecology; reproductive ecology

Peterson, C. H., Prof.
Institute of Marine Science, Univ. of N. Carolina at Chapel Hill, 3407 Arendell Street, Morehead City, NC 28557, USA
Marine benthic ecology; population biology

Pichon, M., Prof.
Australian Institute of Marine Science, PMB No. 3, Townsville M.C., Q. 4810, Australia
Coral-reef ecology; shallow-water tropical communities

Platt, T., Dr
Marine Ecology Laboratory, Bedford Institute of Oceanography, PO Box 1006, Dartmouth, N.S., Canada B2Y 4A2
Phytoplankton ecology; primary production

Rao, T. S. S., Dr
Marine Science Dept, Goa University, Bambolim, P.O. Santa Cruz, Goa 403 005, India
Biological oceanography

Reise, K., Dr
Biologische Anstalt Helgoland, D-2282 List/Sylt, Federal Republic of Germany
Benthos ecology

Sammarco, P. W., Dr
Resource Assessment Commission, Locked Bag No. 1, Queen Victoria Terrace, Canberra, ACT 2600, Australia
Coral-reef ecology; benthic community ecology; ecology of fishes, echinoderms, coelenterates

Savidge, G., Dr
The Queen's Univ. of Belfast, Marine Biology Station, The Strand, Portaferry, Co. Down, Northern Ireland
Phytoplankton ecology; primary production; photosynthesis

Scarlato, O., Prof.
Zoological Institute, Academy of Sciences, Leningrad, V-164, USSR
Dynamics of biocoenoses

Scheltema, R. S., Dr
Woods Hole Oceanographic Institution, Woods Hole, MA 02543, USA
Reproduction, biogeography, and evolution of benthic invertebrates

Schneider, D. C., Dr
Newfoundland Institute for Cold Ocean Science, Memorial University of Newfoundland, St. John's, Newfoundland, Canada A1B 3X7
Dynamics of large organisms; ecology of sea birds

Sherr, B. & E., Drs
The University of Georgia, Marine Institute, Sapelo Island, GA 31327, USA
Microbial food webs; trophic roles of phagotrophic protozoans

Skjoldal, H. R., Dr
Institute of Marine Research, Postboks 1870, N-5024 Bergen-Nordnes, Norway
Food webs and trophic interactions

Southward, A. J., Dr
Plymouth Marine Laboratory, Citadel Hill, Plymouth PL1 2PB, England
Rocky-coast ecosystems; deep-sea ecosystems

Stoecker, D. K., Dr
Woods Hole Oceanographic Institution, Woods Hole, MA 02543, USA
Microzooplankton, particularly ciliates; secondary production

Tenore, K. R., Prof.
Chesapeake Biological Laboratory, PO Box 38, Solomons, MD 20688-0038, USA
Benthic ecology and bioenergetics; production; food chains of detritus-based systems

Thayer, G. W., Dr
Ecosystem Structure Branch, Southeast Fisheries Center, Beaufort, NC 28516-9722, USA
Wetlands ecology, incl. submerged seagrasses and emergent marshes; production and utilization of detritus

Underwood, A. J., Dr
School of Biol. Sci., Univ. Sydney, Zoology Building, Sydney, N.S.W. 2006, Australia
Experimental intertidal and subtidal ecology; behavior; life cycles of sessile invertebrates

Vinogradov, M. E., Prof.
P. P. Shirshov Institute of Oceanology, Academy of Sciences of USSR, 1, Letnaya (Ljublino), Moscow 109387, USSR
Oceanic plankton ecosystems; deep-sea amphipods; biological oceanography

Wangersky, P. J., Prof.
Dept of Oceanography, Dalhousie Univ., Halifax, N.S., Canada B3H 4J1
Organic matter in sea water; theoretical population dynamics; geochemistry; chemical oceanography

Warwick, R. M., Dr
Plymouth Marine Laboratory, Prospect Place, West Hoe, Plymouth PL1 3DH, England
Structure and functioning of benthic communities; meiofaunal ecology; energy flow

Williams, R., Dr
Plymouth Marine Laboratory, Prospect Place, West Hoe, Plymouth PL1 3DH, England
Plankton ecology; community structure, population dynamics

OCEAN MANAGEMENT

Alderdice, D., Dr
Pacific Biological Station, Nanaimo, B.C., Canada V9R 5KR
Pollution of marine environments

Bayne, B. L., Dr
Plymouth Marine Laboratory, Prospect Place, West Hoe, Plymouth PL1 3DH, England
Stress and pollution

Bernhard, M., Dr
ENEA, PO Box 316, I-19100 La Spezia, Italy
Radioactive and conventional pollution

Bravo de Laguna, J., Dr
Ministerio de Agricultura, Pesca y Alimentacion, c/ Marina 26 11, E-38001 Santa Cruz de Tenerife, Spain
Fishery biology; stock assessment

Brown, B. E., Dr
Dept of Biology, The University, Newcastle upon Tyne NE1 7RU, England
Effects of man-made and natural disturbances on coral reefs

Bryan, G. W., Dr
Plymouth Marine Laboratory, Citadel Hill, Plymouth PL1 2PB, England
Heavy metal pollution; estuarine chemistry

Eisler, R., Dr
U.S. Dept of the Interior, Fish and Wildlife Service, Laurel, MD 20708, USA
Toxicology and pollution

Fisher, N. S., Dr
Marine Sciences Research Center, State Univ. of New York, Stony Brook, NY 11794-5000, USA
Pollutant effects on plankton; radioecology

Fowler, S. W., Dr
IAEA, ILMR, Stade Louis II, Entrée C-19, Ave des Castellans, MC-98000 Monaco
Pollution effects on zooplankton; radioecology

Gray, J., Prof.
Institutt for Marinbiologi og Limnologi, Univ. Oslo, Postboks 1064, Blindern, Oslo 3, Norway
Pollution effects on benthos animals

Gulland, J. A., Dr
Marine Resources Assessment Group, Centre for Environmental Technology, Imperial College, 48 Prince's Gardens, London SW7 1LU, England
Management of fishery resources

Gunkel, W., Dr
Biologische Anstalt Helgoland, D-2192 Helgoland, Federal Republic of Germany
Oil degradation; oil pollution

Marinescu, A.-G., Dr
Institute of Biological Sciences, 77748 Bucharest, Str. Splaiul-Independentei 296, Romania
Toxicology and stress responses in invertebrates

Mauchline, J., Dr
Scottish Marine Biological Ass., Dunstaffnage Marine Res. Lab., PO Box 3, Oban, Argyll PA34 4AD, Scotland
Radioactive pollution

McLusky, D. S., Dr
Dept of Biological Sciences, Univ. Stirling, Stirling FK9 4LA, Scotland
Biological effects of pollutants (petro-, chemical, organic enrichment)

Peterson, C. H., Prof.
Institute of Marine Science, Univ. of N. Carolina at Chapel Hill, 3407 Arendell Street, Morehead City, NC 28557, USA
Fisheries management and ecology

Polikarpov, G. G., Prof.
Institute of Biology of South Seas, Academy of Sciences Uk. SSR, 2, Nahimov St., Sevastopol 335000, USSR
Chemical ecology, radioecology, radiotracers, pollution; protection of sea life

Sherman, K., Dr
US Dept of Commerce, NOAA, Northeast Fisheries Center, 28 Tarzwell Dr., Narragansett, RI 02882, USA
Fisheries ecology; fishery resources; zooplankton

CONTENTS

Volume 63 · Number 1 · 1990

RESEARCH ARTICLES

Chin-Leo, G., Kirchman, D. L.
Unbalanced growth in natural assemblages of marine bacterioplankton 1–8

Vernet, M., Mitchell, B. G., Holm-Hansen, O.
Adaptation of *Synechococcus* in situ determined by variability in intracellular phycoerythrin-543 at a coastal station off the Southern California coast, USA 9–16

Van Wambeke, F., Bianchi, M. A.
Effect of organic nitrogen enrichments on marine planktonic networks and heterotrophic bacterial potential 17–25

Hewes, C. D., Sakshaug, E., Reid, F. M. H., Holm-Hansen, O.
Microbial autotrophic and heterotrophic eucaryotes in Antarctic waters: relationships between biomass and chlorophyll, adenosine triphosphate and particulate organic carbon 27–35

Nelson, N. B., Prézelin, B. B.
Chromatic light effects and physiological modeling of absorption properties of *Heterocapsa pygmaea* (= *Glenodinium* sp.) 37–46

Raimbault, P., Gentilhomme, V., Slawyk, G.
Short-term responses of 24 hour N-starved cultures of *Phaeodactylum tricornutum* to pulsed additions of nitrate at nanomolar levels 47–52

Alongi, D. M.
Abundances of benthic microfauna in relation to outwelling of mangrove detritus in a tropical coastal region 53–63

Koop, K., Boynton, W. R., Wulff, F., Carman, R.
Sediment-water oxygen and nutrient exchanges along a depth gradient in the Baltic Sea 65–77

Carey, D. A., Mayer, L. M.
Nutrient uptake by a deposit-feeding enteropneust: nitrogenous sources 79–84

Peterson, W., Painting, S., Barlow, R.
Feeding rates of *Calanoides carinatus*: a comparison of five methods including evaluation of the gut fluorescence method 85–92

Jenkins, G. P., Davis, T. L. O.
Age, growth rate, and growth trajectory determined from otolith microstructure of southern bluefin tuna *Thunnus maccoyii* larvae 93–104

Volume 63 · Numbers 2 and 3 · 1990

RESEARCH ARTICLES

Olla, B. L., Davis, M. W.
Effects of physical factors on the vertical distribution of larval walleye pollock *Theragra chalcogramma* under controlled laboratory conditions 105–112

Allen, D. M., Barker, D. L.
Interannual variations in larval fish recruitment to estuarine epibenthic habitats 113–125

Scheibling, R. E., Raymond, B. G.
Community dynamics on a subtidal cobble bed following mass mortalities of sea urchins 127–145

Tsutsumi, H.
Population persistence of *Capitella* sp. (Polychaeta; Capitellidae) on a mud flat subject to environmental disturbance by organic enrichment 147–156

Tsutsumi, H., Fukunaga, S., Fujita, N., Sumida, M.
Relationship between growth of *Capitella* sp. and organic enrichment of the sediment 157–162

López Gappa, J. J., Tablado, A., Magaldi, N. H.
Influence of sewage pollution on a rocky intertidal community dominated by the mytilid *Brachidontes rodriguezi* 163–175

Volume 63 · Numbers 2 and 3 · 1990

Bricelj, V. M., Lee, J. H., Cembella, A. D., Anderson, D. M.
Uptake kinetics of paralytic shellfish toxins from the dinoflagellate *Alexandrium fundyense* in the mussel *Mytilus edulis* 177–188

Slagstad, D., Tande, K. S.
Growth and production dynamics of *Calanus glacialis* in an arctic pelagic food web 189–199

Øresland, V.
Feeding and predation impact of the chaetognath *Eukrohnia hamata* in Gerlache Strait, Antarctic Peninsula 201–209

Emlet, R. B.
Flow fields around ciliated larvae: effects of natural artificial tethers 211–225

Kuuppo-Leinikki, P.
Protozoan grazing on planktonic bacteria and its impact on bacterial population 227–238

Sullivan, C. W., Cota, G. F., Krempin, D. W., Smith, W. O., Jr
Distribution and activity of bacterioplankton in the marginal ice zone of the Weddell-Scotia Sea during austral spring 239–252

Cho, B. C., Azam, F.
Biogeochemical significance of bacterial biomass in the ocean's euphotic zone 253–259

Thingstad, T. F., Sakshaug, E.
Control of phytoplankton growth in nutrient recycling ecosystems. Theory and terminology 261–272

Antia, A. N., Carpenter, E. J., Chang, J.
Species-specific phytoplankton growth rates via diel DNA synthesis cycles. III. Accuracy of growth rate measurement in the dinoflagellate *Prorocentrum minimum* 273–279

Åberg, P.
Measuring size and choosing category size for a transition matrix study of the seaweed *Ascophyllum nodosum* 281–287

REVIEW

Golikov, A. N., Dolgolenko, M. A., Maximovich, N. V., Scarlato, O. A.
Theoretical approaches to marine biogeography 289–301

NOTES

Clare, A. S.
Laboratory-induced spawning of the gastropod *Gibbula cineraria* as an indicator of field spawning 303–304

Miller, R. J.
Comment on Jellett et al. (1989) 305–306

Jellett, J. F., Novitsky, J. A., Cantley, J. A., Scheibling, R. E.
Rebuttal to R. J. Miller's comment on Jellett et al. (1989) 307–308

MARINE ECOLOGY PROGRESS SERIES

HISTORY: Marine Ecology Progress Series (MEPS) was established in response to requests from numerous marine ecologists from all over the world. The series is based on 'Marine Ecology' – the first comprehensive, integrated treatise on life in oceans and coastal waters – conceived, organized and edited by Professor Otto Kinne, and published by John Wiley & Sons.

AIM: MEPS serves as a world-wide forum for all aspects of marine ecology, fundamental and applied. The journal covers microbiology, botany, zoology, ecosystem research, biological oceanography, ecological aspects of fisheries and aquaculture, pollution, environmental protection, conservation and resource management.
Ecological research has become of paramount importance for man's future. The information presented here should, therefore, encourage critical application of ecological knowledge for the benefit of mankind and, in fact, of life on earth. Marine Ecology Progress Series has received recognition as a leader in its field. The journal strives for

- complete coverage of the field of marine ecology
- the highest possible quality of papers
- quick publication
- a high technical standard of presentation.

SCOPE: MEPS is international and interdisciplinary. It presents carefully selected research articles, reviews and notes concerned with:

Environmental Factors: Tolerances and responses of marine organisms (microorganisms, autotrophic plants, and animals) to variations in abiotic and biotic components of their environment; radioecology.

Physiological Mechanisms: Synthesis and transversion of organic material (mechanisms of auto- and heterotrophy); thermo-, ion-, osmo- and volume-regulation; stress resistance; non-genetic and genetic adaptation; population genetics; orientation in space and time; migrations; behavior.

Cultivation: Maintenance and rearing of, as well as experimentation with, marine organisms under environmental and nutritional conditions which are, to a considerable degree, controlled; analysis of the physiological and ecological potential of individuals, populations and species; determination of nutritional requirements; ecological aspects of aquaculture; water-quality management; culture technology.

Dynamics: Production, transformation, and decomposition of organic matter in marine ecosystems; food webs; trophic interrelations; population dynamics; plankton ecology; benthos ecology; estuarine and coastal ecology; wadden-sea ecology; coral-reef ecology; deep-sea ecology; open-ocean ecology; polar ecology; theoretical ecology; ecological modelling.

Ocean Management: Applied marine field ecology; inventory, protection and management of living resources in coastal areas, estuaries and open oceans; ecological aspects of fisheries; pollution of marine areas and organisms; protection of life in the seas; management of populations, species and ecosystems; management of coastal zones and sea areas.

Subscription Information

10 volumes will appear in 1990 (Volumes 58 to 67)

Price per volume (3 numbers each): DM 310
Price per single number: DM 125
Annual rate for 10 volumes: DM 3100 (ca US $ 1700, subject to exchange rates)
Prices include postage, handling and insurance

Special Conditions (for personal use of individual scientists only)

(1) Editorial Advisors: free copies.
(2) Staff Referees: DM 100 per volume, providing their institutional library subscribes to MEPS.
(3) All other scientists: DM 130 per volume, providing their institutional library subscribes to MEPS.
(4) Students: DM 110 per volume, providing their university library subscribes to MEPS.

Subscriptions are entered with annual prepayment only. They should be addressed to the publisher.

Missing issues must be claimed within 5 months after publication.

Publisher: Inter-Research, PO Box 1120, D-2124 Amelinghausen, Federal Republic of Germany.

Advertisements

1/1 page	ready-to-print film	= DM 120	1/2 page	ready-to-print film	= DM 70
	proof-requiring text	= DM 165		proof-requiring text	= DM 90

As a service to science, announcements of important scientific meetings are printed free of charge.

Copyright © Inter-Research, Amelinghausen, 1990. All rights reserved. Mar. Ecol. Prog. Ser. 1990. Printed in F.R. Germany by Westholsteinische Verlagsdruckerei Boyens & Co., D-2240 Heide. Publisher and editors provide no warranty, express or implied, with respect to the information presented in MEPS; they cannot accept any legal responsibility for possible errors or omissions.

Manuscript Preparation, Mailing and Processing

Manuscripts submitted to MEPS must (1) not be submitted simultaneously to any other publication outlet; (2) be original, i.e. not published before; (3) have been approved by all immediately involved, e.g. authors, institutional authorities.

Preparation

Research articles (in general not exceeding 10 printed pages), reviews (up to 25 printed pages) and notes (1 to 3 printed pages) must be typewritten with double spacing. Marine Ecology Progress Series invites interpretative rather than descriptive contributions. Reviews should be critical, instructive evaluations of the state-of-the-art – not mere compilations of information.

Abstracts. All contributions must be preceded by a brief, concise abstract. In the shortest possible way, the abstract should outline the scope of the paper and highlight its main results and conclusions.

Figures must be very carefully prepared, numbered and accompanied by brief, precise legends. For examples consult recent issues. Mark desired position of figures in the manuscript margin.

Tables should not be excessive in size. They must be numbered and be headed by brief, compendious legends. Mark desired position of tables in the manuscript margin. Unusual symbols used must be explained.

Genus and species names: underline for *italics*. Genus names should appear in full the first time mentioned in a given paragraph.

Citation of literature. All literature quoted in the text must be listed, in alphabetical order of author names, at the end of the manuscript. Please abbreviate publications according to 'World List of Scientific Periodicals', latest edition, London. For examples of literature citation see below.

Mailing

Address manuscripts (original plus 2 copies) to the editor or to an Editorial Advisor. For safety use registered mail.

Processing

Manuscripts are critically evaluated by at least 3 reviewers. The editor then decides on acceptance or rejection. Acceptable manuscripts are usually returned to the author requesting consideration of comments and criticism. Present rejection rates range from 35 to 50 % for manuscripts from different parts of the world.

When an accepted manuscript is ready for publication, the author will be notified and the date of acceptance fixed. This date appears at the end of each printed contribution, together with the date of first receipt of the manuscript. Average time between acceptance and publication is 3 mo. *For still faster processing submit mss – prepared in MEPS format – on diskette along with a print-out copy.*

The author receives 2 sets of proofs directly from the printer. Printing errors must be carefully corrected. At this stage, stylistic changes are not acceptable without compensatory payment. Please return 1 set of proofs by air mail.

Offprints. Forty offprints (reprints) of each contribution will be made available free of charge. Additional offprints can be purchased. For offprint prices consult the form accompanying the proofs. Orders for additional offprints must be made when returning the proof (use the form provided).

Marine Ecology Progress Series levies no page charge.
The last issue of each set of 10 volumes features a combined author/title index.

Examples of Literature Citation

Periodicals

LaRoche, J., Harrison, W. G. (1987). Compartmental models of nitrogen cycling in tropical and temperate marine environments. Mar. Ecol. Prog. Ser. 38: 137-149

Books

Fenchel, T. (1987). Ecology - potentials and limitations. In: Kinne, O. (ed.) Excellence in ecology 1. Ecology Institute, Oldendorf/Luhe, FRG

Rheinheimer, G. (1985). Aquatic microbiology, 3rd edn. VEB Gustav Fischer Verlag, Jena

Papers from books

Margalef, R. (1978). General concepts of population dynamics and food links. In: Kinne, O. (ed.) Marine ecology, Vol. IV, Dynamics. Wiley, Chichester, p. 617-704

Copyright
With the acceptance of a manuscript, the copyright is transferred to the publishers. Reproduction of any part of this publication by any means, as well as translation, requires their written permission. Trade marks or names appearing in this series may be subject to protective regulations or laws. The Article Fee Code (at the bottom of the first page of each paper) indicates the copyright holder's consent that, in the USA, copies of the paper may be made for personal or internal use. This consent is granted on condition that the copier pay the stated fee through the Copyright Clearance Center, Inc., PO Box 8891, Boston, Mass. 02114, for copying beyond that permitted by Section 107 or 108 of the US Copyright Law.